Functional Public Procurement and Innovation—A Conceptual Framework

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Innovation; Public procurement

Abstract

The literature on the relationship between public procurement and innovation has been growing rapidly during the last couple of decades. However, there are still conceptual problems and ambiguities. This contribution puts forward a conceptual framework to sort out and specify notions such as "innovation", "public procurement", "product procurement", "functional procurement" and "innovation partnerships"—as well as the relations between them. In developing this conceptual framework, we argue that the distinction between product specifications and functional specifications is a useful dichotomy when discussions of the relations between public procurement and innovation are pursued and when public procurement is carried out in practice. It can be instrumental in transforming procurement that prevents innovations into procurement that enhances innovations. The development of this dichotomy means that we have changed the conceptual framework needed to understand and explain the relationships between (different kinds of) public procurement on one hand and innovation on the other hand. We note that functional procurement is allowed under the EU procurement directives (and by implication the WTO Agreement on Government Procurement) as well as the UNCITRAL Model Law on Public Procurement. In fact, the EU directives strongly encourage functional procurement, stating that it "should be used as widely as possible". Additionally, the EU directives on procurement introduced "Innovation partnership" as a new procurement procedure. It is intended to also address research and development results and innovations as outcomes of public procurement processes. However, this procedure has not been used very much. One reason is that the directive needs a much higher specificity to become operatively useful. This procedure should also be related to functional public procurement.

1. Introduction

If no innovations, in the sense of new products, had occurred during the last 200 years,[1] then no cars, trains or aircraft, no modern medical equipment, no phones, no internet, etc. would have existed. This quick look in the rear mirror is enough to show that innovations are the force that has most transformed our societies.[2]

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[1] This contribution builds on the earlier working paper, Charles Edquist, *Papers in Innovation Studies, Lund University, CIRCLE—Centre for Innovation Research No 2023/4: Functional Public Procurement and Innovation—The Concepts* and a conference paper, "Functional Public Procurement for Innovation, Welfare and Sustainability" delivered by Charles Edquist at the International Conference on Public Procurement and Innovation in Africa, hosted by the South African National Research Foundation and organised by Geo Quinot on 15–16 November 2023 in Pretoria, South Africa.

[2] C. Edquist, "Funktionsupphandling för innovation, välfärd och miljö, report for the Swedish Competition Agency" (with summary in English) (2019), p.10, *https://www.konkurrensverket.se/globalassets/dokument/informationsmaterial/rapporter-och-broschyrer/uppdragsforskning/forsk-rapport_2019-2_funktionsupphandling-for-innovation-valfard-och-miljo.pdf*.

Innovations have had enormous significance as a force of change of our socio-economic, environmental, and political systems. For example, they have been the source of more than 90% of all increased productivity since 1870.[3] Innovations have thereby been—and continue to be—the most important source of creation of welfare, since the increased productivity can be used to raise wages, increase profits and elevate taxes. Innovations have also had a very large negative impact on the environment, climate and health. Currently, they are critical means to mitigate these negative consequences in the medium and long term.[4]

Public procurement is when public agencies (national, regional, local) buy goods, works and services to fulfil their public functions. It is a large part of the economy in many countries as the following figures clearly show:[5]

- The global procurement market is estimated at US $13 trillion per annum (1 trillion is written with 12 zeros!).[6]
- The World Trade Organization covers public procurement of US $1.7 trillion every year.[7]
- 250 000 public authorities in the EU spend around 14% of the EU gross domestic product (GDP) (almost €2 trillion) on public procurement per year.[8]
- In the Organisation for Economic Co-operation and Development (OECD) countries, public procurement is on average 12.9% of GDP and in developing countries it may amount up to 30% of GDP.[9]
- Public procurement as a percentage of national public expenditure has in recent years amounted to:[10]
  - 46.4% in Peru,
  - 45% in the Netherlands and Australia,
  - 41% in Japan,
  - 28.7% in Canada, and
  - 20% in India.
- As a percentage of GDP, public procurement has in recent years amounted to:[11]
  - 25% in Bangladesh,
  - between 20% and 22% in Ecuador, India, Kuwait, Morocco and the Netherlands,
  - 18% in Algeria, Australia, Egypt, Fiji, Germany and Japan, and

[3] David S. Landes, Joel Mokyr and William J. Baumol (eds), *The Invention of Enterprise: Entrepreneurship from Ancient Mesopotamia to Modern Times* (Princeton: Princeton University Press, 2010).

[4] Stelvia Matos, Eric Viardot, Benjamin K. Sovacool, Frank W. Geels and Yu Xiong, "Innovation and Climate Change: A Review and Introduction to the Special Issue" (2022) 117 *Technovation* 1; Hsin-Ning Su and Igam M. Moaniba, "Does innovation respond to climate change? Empirical evidence from patents and greenhouse gas emissions" (2017) 122 *Technological Forecasting and Social Change* 49; David Popp, "Innovation and Climate Policy" (2010) 2 *Annual Review of Resource Economics* 275.

[5] It is widely accepted that exact calculation of the true size of the public procurement market globally is notoriously difficult (if not impossible) due to challenges in methodology, metrics and reliable data among others. See Erica Bosio, Samuel Garoni, Marko Grujicic and Vinay Sharma, "The size matters: how to measure the mysterious volume of public procurement" (13 July 2021), *World Bank Blogs*, *https://blogs.worldbank.org/developmenttalk/size-matters-how-measure-mysterious-volume-public-procurement*; Fatima Hafsa, Nicole Darnall and Stuart Bretschneider, "Estimating the True Size of Public Procurement to Assess Sustainability Impact" (2021) 13 *Sustainability* 1448.

[6] Open Contracting Partnership, "How governments spend: Opening up the value of global public procurement" (2020), *https://www.open-contracting.org/wp-content/uploads/2020/08/OCP2020-Global-Public-Procurement-Spend.pdf*.

[7] Andres B. Schwarzenberg, "WTO Agreement on Government Procurement (GPA)" (2023) *Congressional Research Service*, *https://crsreports.congress.gov/product/pdf/IF/IF11651*.

[8] European Commission, "Internal Market, Industry, Entrepreneurship and SMEs – Public Procurement", *https://single-market-economy.ec.europa.eu/single-market/public-procurement_en*.

[9] OECD, "Government at a Glance 2023: Size of public procurement" (2023), *https://www.oecd.org/en/publications/2023/06/government-at-a-glance-2023_da193b0d/full-report/component-36.html#indicator-d1e21715-0405ed0e79*; UNEP, "Sustainable Public Procurement" (2024), *https://www.unep.org/explore-topics/resource-efficiency/what-we-do/sustainable-public-procurement*.

[10] OECD, "Government at a Glance: Latin America and the Caribbean: Size of Public Procurement" (2020), *https://www.oecd-ilibrary.org/governance/government-at-a-glance-latin-america-and-the-caribbean-2020_cc2a1952-en*; OECD, "Government at a Glance 2023: Size of public procurement" (2023); Anjali Sharma and Susan Thomas, "The footprint of union government procurement in India" (November 2021), *https://www.thakur-foundation.org/upload/grant_applicants_outcome/1652819352_2021SharmaThomas_publicprocurementestimation.pdf*.

[11] Open Contracting Partnership, "How governments spend: Opening up the value of global public procurement" (2020); Ministry of Finance, "FM Reviews Capital Expenditure & Payments of Maharatnas and Navratnas CPSEs" (28 September 2019), *https://pib.gov.in/PressReleasePage.aspx?PRID=1586546*; OECD, "Government at a Glance 2023: Size of public procurement" (2023).

— 16% in Brazil, Cuba, Hungary and Sweden.

In the context of innovation, this significant size of public procurement must be juxtaposed against the value of publicly funded research and development (R&D), which amounted to about 1.79% of GDP globally in 2018.[12] Public procurement is quite evidently many times larger in terms of expenditure.

The literature on the relationship between public procurement and innovation has been growing rapidly during the last couple of decades.[13] However, there are still conceptual problems and ambiguities. This is, for example, true for the notions of "functional procurement" and "innovation partnerships". Functional procurement refers to an approach to public procurement where no goods or services are described. Instead, problems which the public buyer wants to have solved by means of procurement are described.[14] An innovation partnership is a particular procurement procedure set out in EU procurement law.

A purpose of this paper is to try to sort out conceptual ambiguities with regard to key concepts in the field and the relationship between public procurement and innovation. This clarification is partly based on earlier work. However, additional concepts have now been addressed and we have here attempted to integrate previous concepts and new ones into a more holistic conceptual framework.

The share of procurement spending that stimulates innovation, by means of, for example, functional procurement remains small as we show below. However, no detailed and comprehensive statistics on functional procurement exist to date.[15] To create such data is an important task. Empirical studies on the use of functional procurement requires a clear conceptual structure. That is, the questions must be based on a conceptual framework that specifies all concepts that are important. These central concepts must be defined in a very clear and specific way. This paper aims to provide that basis.

We position the development of the conceptual framework at two regulatory levels, viz the EU Public Procurement Directives[16] and the United Nations Commission on International Trade Law (UNCITRAL) Model Law on Public Procurement 2011 (hereinafter: the Model Law). By doing so, the conceptual framework should be suitable for analysis of public procurement data across a wide range of procurement systems. Not only do the EU Directives normatively frame procurement within the EU, but since the EU is also a party to the World Trade Organization's Agreement on Government Procurement (WTO GPA), alignment between the conceptual framework and the EU Directives implies alignment with the WTO GPA as well. This brings a further set of systems into the conceptual framework. Outside of the WTO GPA and pertinently regarding developing economies, the Model Law is the most influential international instrument on public procurement.[17] Alignment between the conceptual framework and the Model Law thus brings an additional range of countries within the conceptual framework.

We start our analysis by focusing on what public procurement is, differentiating between *what* is procured and *how* it is procured. We then move on to consider some concepts to capture the relationship between public procurement and innovation, specifically "innovation", "public procurement and

[12] S. Schneegans, T. Straza and J. Lewis (eds), *UNESCO Science Report: The Race Against Time for Smarter Development* (2021), p.34, UNESCO, *https://unesdoc.unesco.org/ark:/48223/pf0000377433*.

[13] See Oishee Kundu, Andrew D. James and John Rigby, "Public procurement and innovation: a systemic literature review" (2020) 47 *Science and Public Policy* 490.

[14] C. Edquist and J.M. Zabala-Iturriagagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595.

[15] C. Edquist, "Towards a holistic innovation policy: Can the Swedish National Innovation Council (NIC) be a role model?" (2018) 48 *Research Policy* 869; C. Edquist, "Mutual Learning Exercise (MLE), Innovation related public procurement. Developing strategic frameworks for innovation related public procurement. Thematic Report Topic A", European Commission, Directorate-General for Research & Innovation, Directorate Policy Development and Coordination (2017), *https://projects.research-and-innovation.ec.europa.eu/sites/default/files/rio/report/MLE-IP%2520topic%2520A%2520report%2520V2_03112017.pdf*.

[16] Directive 2014/24 on public procurement [2014] OJ L94/65 and Directive 2014/25 on procurement by entities operating in the water, energy, transport, and postal services sectors [2014] OJ L94/243 (hereinafter: the EU Directives).

[17] S. Arrowsmith, "Public Procurement: an Appraisal of the UNCITRAL Model Law as a Global Standard" (2004) 53 *International and Comparative Law Quarterly* 17; E. Caborn and S. Arrowsmith, "Procurement methods in the public procurement systems of Africa" in G. Quinot and S. Arrowsmith (eds), *Public Procurement Regulation in Africa* (Cambridge: Cambridge University Press, 2013), p.264; C. Nicholas, "UNCITRAL and the internationalization of government procurement regulation" in A. Georgopoulos, B. Hoekman and P.C. Mavroidis (eds), *The Internationalization of Government Procurement Regulatio*n (Oxford: Oxford University Press, 2017), p.88.

innovations" and "innovative procurement", which allows us to formulate the concept of "functional procurement". In s.4, we position the concept of functional procurement within EU procurement law and the Model Law. Finally, we focus specifically on the distinct procurement procedure of innovation partnership that was introduced in the 2014 EU Directives, before concluding on the promise of "functional procurement" in analysing the use of public procurement in support of innovation.

2. What is public procurement?

To try to sort things out, we will below try to answer the following distinct questions: *What* is being procured according to the EU Directives and Model Law? That is, what is the result of the procurement? And *how* should the procurement be pursued according to the EU Directives and Model Law? That is, what is the process of procurement?

Public procurement is an interactive relation, normally between public buyers and private suppliers. Here we are particularly interested in the relations between public procurement and innovation, which will also lead us into a discussion of what we call "functional procurement".

Public procurement is regulated by detailed legal rules in most countries. The result is that public procurement law has a determinative impact on conceptualisation in public procurement practice in most countries.

The EU Directives are (at least partly) adopted by all Member States. Since the EU Directives are binding on all EU Member States, there may be no contradictions between the directives and the laws in the Member States governing public procurement that is subject to the directives.

The EU Directive 2014/24 on public procurement specifies as follows: "The Union Directives on public procurement are not intended to cover all forms of disbursement of public funds, but only those aimed at the acquisition of *works*, *supplies* or *services* for consideration by means of a public contract."[18] The specification of "works", "supplies" and "services" is crucial. The three terms are used in the EU Directives 207 times, 120 times and 430 times respectively.

With public procurement is meant the measures taken by public agencies to buy goods, services or works (construction contracts). *What* is being bought by means of public procurement are material "goods", intangible "services" or civil engineering "works" (or "buildings").[19] These are the only things that can be bought in public procurement and qualifying goods, services and works are subject to the procurement directives and must follow them. This should give a reasonably clear indication of what is meant by goods, services and works in the EU Directives.

The position is largely similar under the Model Law. It defines "procurement" as "the acquisition of goods, construction or services by a procuring entity".

How the process of procurement shall be carried out is also prescribed in the EU Directives and Model Law respectively. There are, for example, six "procedures" according to which public procurement shall be carried out under the EU Directives. They are:

1. Open procedure;
2. Restricted procedure;
3. Competitive procedure with negotiation;
4. Competitive dialogue;
5. Innovation partnership; and
6. Negotiated procedure without prior publication.

Actually, much of the EU Directives (230 pages) are focussed on regulating procurement procedures.

[18] Directive 2014/24 art.4 (emphasis added).

[19] "Goods" and "services" are often together called "products". In this paper, we also include "works" or "construction" (i.e. buildings or some other form of infrastructure) in the term "products".

Likewise, the bulk of the Model Law sets out "methods of procurement" (comprising six of the eight chapters), which contain the rules for various procedures that may be prescribed according to which procurement must be carried out. The Model Law provides for eleven different procedures, as follows:

1. Open tendering;
2. Restricted tendering;
3. Request for quotations;
4. Request for proposals without negotiation;
5. Two-stage tendering;
6. Request for proposals with dialogue;
7. Request for proposals with consecutive negotiations;
8. Competitive negotiations;
9. Electronic reverse auction;
10. Single-source procurement, and
11. Framework agreement procedure.[20]

However, as a model law, the intention is not that a country will necessarily incorporate all of these procedures into its own law. The Model Law advises that "States may choose not to incorporate all the methods of procurement listed … into their national legislation, although an appropriate range of options, including open tendering, should be always provided for."

It is beyond the scope of this contribution to explore all of these procedures individually in relation to functional procurement. However, we will address the procedure of "innovation partnership" in s.5 below given its close and obvious proximity to innovation.

In most public procurements that are carried out in terms of the procedures above, an existing product is described in the procurement documents. Often this description is quite—or even very—detailed.[21] When such product specifications are used, we call this "product procurement". Hence, *product procurement* is when existing products to be bought are described in the procurement documents.[22]

This contrasts with "functional procurement". *Functional procurement* is "when a public agency buys products that perform functions that provide solutions to problems"[23] and when functional specifications are (also) used in the procurement documents. In the background material for such procurements, no products are described. Instead, problems which the public buyer wants to have solved by means of procurement are described. We will discuss this in s.3.2.

In s.3.2, we will also argue that the distinction between these two concepts is a simple, important, and useful dichotomy when discussions of the relations between public procurement and innovation are pursued and when public procurement is carried out in practice.

3. Concepts to capture the relationship between public procurement and innovations

As mentioned, we are, in this paper, interested in the relationship between public procurement and innovation—in the real world, but also as codified in law.

[20] Model Law art.27.

[21] For some examples, see C. Edquist, L. Hommen, and L.J. Tsipouri (eds), *Public Technology Procurement and Innovation* (New York: Kluwer Academic Publishers, 2000).

[22] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 596.

[23] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 597, 598 and 601.

3.1 "Innovations" in the Oslo Manual

Let us start with a short discussion of what is meant by an "innovation" according to the *Oslo Manual*, which is the standard basis for such discussions.[24] The general definition of innovation in the *Oslo Manual* is as follows:

> "An innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)."[25]

In other words, an innovation is the outcome, output or result of an innovation process, i.e. a new product or a new process.

As Edquist and Zabala-Iturrigagoitia state: "Developing a prototype or a test series is obviously not enough for something new (a new creation) to qualify as an innovation."[26] The new creation must also have been produced and sold to or used in a certain number of units. This definition is relevant to all sectors and units in an economy. We will use parts of this definition below.

According to the *Oslo Manual*, "Innovation activities include all developmental, financial and commercial activities undertaken by a firm that are intended to result in an innovation for the firm."[27]

Innovations in the sense of "outcome" are often divided into product innovations and process innovations. Product innovations are new—or better—material goods as well as new intangible services. Process innovations are new ways of producing goods and services. They may be technological or organisational.[28]

In other publications, we address determinants of innovation processes in more detail.[29] Edquist provides a detailed list of ten "activities" (in our sense) that are important for most systems of innovation.[30] They are the determinants of innovation processes and—together—they define a system of innovation. Accordingly, we consider it very important to make a clear distinction between innovations as such (or as outcomes, outputs and results) on the one hand, and determinants of innovation processes (which are actually "inputs" or "activities" in innovation efforts) on the other hand. Hence, we use the notion of "activities" in a different way than the OECD and Eurostat in the *Oslo Manual*.

In addition, we note that innovation activities do not necessarily lead to innovations (outcomes) *at all*. In the *Oslo Manual* definition above the "innovation activities" are only "*intended*" to lead to innovations. These intentions may fail.

There is also a *specific* reason for distinguishing between product and process innovations in this paper. We are addressing only the procurement of goods, services, and works. This is what can normally be acquired in public procurement. Therefore, process innovations are less relevant for this paper than product innovations.

[24] The *Oslo Manual* was first published in 1992 as an international reference guide on collecting and publishing data on innovation. The most recent version, the 4th edition, was published in 2018 by the OECD and Eurostat.

[25] OECD and Eurostat, *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, 4th edn (OECD Publishing/Eurostat, 2018), p.32.

[26] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 596.

[27] OECD and Eurostat, *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, 4th edn (2018), p.68.

[28] C. Edquist, "Systems of Innovation: Perspectives and Challenges" in J. Fagerberg and D.C. Mowery (eds), *The Oxford Handbook of Innovation* (Oxford: Oxford University Press, 2005), p.182.

[29] S. Borrás and C. Edquist, *Holistic Innovation Policy: Theoretical Foundations, Policy Problems and Instrument Choices* (Oxford: Oxford University Press, 2019); Charles Edquist and Mart Laatsit, "From the Systems of Innovation Approach to a General Theory of Innovation: Do Activities and Functions Reflect what Happens in Innovation Systems?" (2022) *Papers in Innovation Studies*, No.2022/07, *https://swopec.hhs.se/lucirc/abs/lucirc2022_007.htm*.

[30] Edquist, "Systems of Innovation: Perspectives and Challenges" in Fagerberg and Mowery (eds), *The Oxford Handbook of Innovation* (2005), pp.190–191.

3.2 "Public procurement and innovations" in the EU Directives and Model Law

In s.2, we mentioned that the lion's share of all public procurement is what we call "product procurement", in which a product (i.e. goods, services or works) that the public organisation wants to buy is described in the procurement documents. Such product descriptions may sometimes be quite detailed. Even obsolete products may be described in the documents. Potential suppliers then try to provide exactly the products described. Such product specification will not lead to innovations in the sense of new products.

Since the 1990s, EU policy-makers, researchers and procurers have used terms combining the notions of "procurement" and "innovation. Examples are "innovative procurement", "innovation procurement", and "public procurement of innovation". The probable reason is that they have perceived a potential in enhancing innovations resulting from public procurement, given that the volume of public procurement is very large—as we noted in s.1. The ultimate objective was that the resulting innovations, in turn, would increase productivity growth and mitigate the socio-economic and environmental challenges faced by municipalities as well as regional and national public agencies.[31] Such challenges may be of many kinds: economic (low productivity), environmental, related to climate and health, etc. To mitigate such challenges is a matter of formulating appropriate *objectives* of public procurement and other innovation policy instruments.

In the EU Directives, certain terms are also used to capture "innovation" in a procurement context. Some of them are listed below, taken from the text of the Directives, i.e. they are quoted "out of their context":

- "Public procurement of innovation";[32]
- "Innovation procurement";[33]
- "Innovative solutions";[34]
- "Public procurement to spur innovation";[35]
- "Buying innovative products";[36]
- "Innovative works";[37]
- "Public procurement is crucial to driving innovation";[38] and
- "Innovation activities required for the development of an innovative solution not yet available on the market".[39]

In contrast to the EU Directives, the Model Law does not use the term "innovation" at all.

If a product can be described ex ante (before it exists) in some detail, it is not an innovation. Only existing products can be described since we cannot predict the characteristics of innovations. What is called "innovation procurement" is therefore impossible—if it means that an innovation (a non-existing—new—product) shall be described. Hence, product procurement cannot lead to innovations.

Just like other researchers and policy advisors we have also, in previous studies, argued that innovations could be achieved by means of public procurement through describing products that did not exist.[40]

[31] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 598 and 600.
[32] Directive 2014/24 art.47.
[33] Directive 2014/24 arts 95, 123.
[34] Directive 2014/24 arts 26, 31, 43, 49.
[35] Directive 2014/24 art.47.
[36] Directive 2014/24 art.47.
[37] Directive 2014/24 arts 47, 49.
[38] Directive 2014/24 art.95.
[39] Directive 2014/24 art.31.
[40] Edquist, Hommen and Tsipouri, *Public Technology Procurement and Innovation* (2000); C. Edquist, N. Vonortas, J.M. Zabala and J. Edler (eds), *Public Procurement for Innovation* (Cheltenham: Edward Elgar Publishing, 2015); C. Edquist and J.M. Zabala-Iturriagagoitia, "Public Procurement for Innovation (PPI) as Mission-oriented Innovation Policy" (2012) 41(10) *Research Policy* 1757; C. Edquist and J.M. Zabala-Iturriagogoitia "Pre-commercial Procurement: A Demand or Supply Policy Instrument in Relation to Innovation?" (2015) 45(2) *R & D Management* 147; Edquist

However, further reflection has made us conclude that this is not possible. The reason is that the term "innovation procurement" is contradictory and inappropriate since we cannot describe products that do not yet exist.

The philosopher Karl Popper argued that it is not possible to predict future knowledge.[41] Anyone who claims that they can predict and describe future knowledge also claims that they already have this knowledge—although it does not exist. This is certainly contradictory.[42] What is true for knowledge in a general sense is also true for innovations.[43]

Public agencies want to acquire products (goods, services, and works) to *use* them for something. With the help of the products procured, public organisations intend to achieve a goal or a mission, satisfy human needs, solve a societal or climate problem, etc. The public agencies want to be able to address and meet challenges, i.e. have a function fulfilled. And this is done in the interest of the citizens.[44] In fact, this is a core distinction between public procurement and private acquisition of products. While private acquisition of products is only that, i.e. obtaining the product,[45] public procurement necessarily involves both the acquisition of the product *and* the public function to be served by the product.[46]

An alternative to product procurement is that the procuring public agency describes these problems, missions, or functions in the procurement documents. When such a description exists, we use the term *functional procurement*. Functional procurement is when a public agency buys products that perform functions which provide solutions to problems described and functional specifications with reference to these problems and functions are used.

In the case of functional procurement, the procuring agency specifies *what* is to be achieved rather than *how* it is to be achieved. In the words of Edler and Georghiou, "for the tender process to induce innovation in the marketplace, it is indispensable that it is based on specifying functionalities rather than designs".[47]

Functional procurement *can potentially* lead to new products (innovations) but does not have to. It *opens* procurement for innovation.[48] New products that did not exist when the procurement process started can be the result. These new products compete with existing products and can be selected by the procuring agency, if they fulfil the (functional) requirements to a larger degree than the old products, to a reasonable price. It is a matter of solving problems, satisfying needs and meeting challenges. [49]

This has led us to the following conclusion: From an innovation point of view, there are reasons to talk about (to create or construct) two main categories of public procurement, namely:

and Zabala-Iturriagagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595; Geo Quinot, "Innovation, State Contracting and Public Procurement Law" (2015) 7(1) *Trade, Law & Development* 137.

[41] Karl Popper, *The Poverty of Historicism* (London and New York: Routledge, 1957).

[42] Popper's general interest was to prove that "for strictly logical reasons it is impossible for us to predict the course of history". Popper, *The Poverty of Historicism* (1957), p.ix; Edquist and Zabala-Iturriagagoitia, , "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595.

[43] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 597.

[44] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595; Geo Quinot and Benjamin V. Rosa, "Preferences and Political Economy in Public Procurement" in Annalisa Castelli, Gustavo Piga and Tünde Tátrai (eds), The Economics and Law of Public Procurement—New Global Scenarios (London: Routledge, 2024), p.175.

[45] The private acquisition of the product may of course also be aimed at some purpose, but that purpose, including whether any purpose exist, is largely irrelevant for purposes of conceptualising the private acquisition.

[46] Quinot and Rosa, "Preferences and Political Economy in Public Procurement" in Castelli, Piga and Tátrai (eds), *The Economics and Law of Public Procurement—New Global Scenarios* (2024), p.175.

[47] J. Edler and L. Georghiou, "Public procurement and innovation – Resurrecting the demand side" (2007) 36(7) *Research Policy* 949, 960.

[48] Edler and L. Georghiou, "Public procurement and innovation – Resurrecting the demand side" (2007) 36(7) *Research Policy* 949, 960; L. Georghiou, J. Edler, E. Uyarra and J. Yeow, "Policy Instruments for Public Procurement of Innovation: Choice, Design and Assessment" (2014) 86 *Technological Forecasting and Social Change* 1.

[49] Edquist, "Funktionsupphandling för innovation, välfärd och miljö, report for the Swedish Competition Agency" (with summary in English) (2019), p.12; Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595. Obviously, this does not imply that all problems/needs can be solved/satisfied through public procurement. Of course, many social problems require social and political solutions instead (e.g. gender equality, social justice, etc.).

- *Product Procurement:* Procurement based on *product specifications*, i.e. when public organisations describe the products that it wants to acquire.
- *Functional Procurement:* Procurement based on *functional specifications*, i.e. when a public agency acquires products that perform functions that provide solutions to problems and when functional specifications are (also) used in the procurement documents.[50]

This dichotomy is simple, purposeful, effective, and sufficient to be a basis for the design of procurement processes that may lead to innovations. It can be instrumental in transforming procurement that prevents innovations into procurement that enhances innovations.[51]

The development of this dichotomy means that we have changed the conceptual framework needed to understand and explain the relationships between (different kinds of) public procurement on the one hand and innovation on the other. It has also radically changed our perspective on how to pursue practical procurement activities in a way that enhances innovations.[52]

3.3 "Innovative procurement"

The notion of "innovative procurement" is sometimes used and can mean different things:

- That the result of the procurement process may be an innovation (a new product).
- That the procurement process is pursued in a new and innovative way.

It is important to distinguish between the two. But they are also related to each other. For example, we have shown that "product procurement" cannot lead to innovations. For this to happen, the procurement must be transformed into functional procurement, i.e. the product specifications must be changed into functional specifications.

As mentioned in s.1, functional procurement has, however, been used to a limited extent so far. We do not even know how much it has been used.

To increase the propensity to use functional procurement, two things would be important:

- A plan of action for the diffusion of the use of functional procurement should be developed. An important part of such a plan should focus upon how product procurement can be transformed into functional procurement. It must also include how human needs can be identified and how societal problems can be solved or mitigated by functional procurement. The transformation of these needs and problems must also be translated into functional specifications.
- Functional procurement should be developed into a full-scale procurement procedure in the EU Procurement Directives—in addition to the six procedures mentioned in s.2.

These are major tasks to develop, and this cannot be pursued here and now.

[50] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 597.

[51] Edquist, "Towards a holistic innovation policy: Can the Swedish National Innovation Council (NIC) be a role model?" (2018) 48 *Research Policy* 869. In addition to this dichotomy, there are several other taxonomies of different kinds of innovations and different kinds of procurement. One example is the distinction between incremental and radical innovations. Another one is between regular product procurement and pre-commercial procurement. These other taxonomies are, however, not addressed in this paper. The reason is that we deal with the issue from an *innovation* point of view. If a public agency wants to influence the *direction* of innovation processes by means of public procurement, this can (only) be done by pursuing functional procurement. An important example in a world with serious climate problems is to require that fossil free products are the result of the procurement process. Functional procurement may, of course, also be pursued with environmental, medical, military, and other objectives.

[52] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595.

4. Is functional procurement allowed?

As a matter of fact, the notion of functional public procurement and functional specifications are not completely new in the context of the EU Directives nor in the Model Law.

Text about "Specifications in terms of functional and performance requirements" was included in the 2014 EU Directives and has been strongly stressed. The reference to functional specifications in the Directives is quite remarkable. The preamble of Directive 2014/24 states the following as one of its recitals:

> "technical specifications should be drafted in such a way as to *avoid artificially narrowing down competition* through requirements that favour a specific economic operator by mirroring key characteristics of the supplies, services or works habitually offered by that economic operator. *Drawing up the technical specifications in terms of functional and performance requirements generally allows that objective to be achieved in the best way possible. Functional and performance-related requirements are also appropriate means to favour innovation in public procurement and should be used as widely as possible."*[53]

This means that the problems of inhibiting innovation associated with using "product procurement" and "innovation procurement" can be circumvented by using "functional procurement". Hence, functional procurement is not only allowed by the EU Directives. It is strongly encouraged "and should be used as widely as possible".

The Model Law, in contrast to the EU Directives, does not explicitly refer to functional procurement. A first reading of the Model Law may suggest that its concept of "the subject matter of the procurement" restricts procurement under the Model Law to product procurement and excludes functional procurement. However, upon a closer reading of the whole Model Law, it seems that functional procurement is indeed allowed.

The Model Law uses the concept, "subject matter of the procurement" (briefly, "subject matter"), to generically refer to the goods, construction, or services to be acquired in the procurement. Article 10 of the Model Law sets out the rules concerning the description of the subject-matter. The text of art.10 is quite ambivalent about product procurement versus functional procurement. On the one hand, art.10(3) states that the "description of the subject matter of the procurement may include specifications, plans, drawings, designs, requirements, testing and test methods, packaging, marking or labelling or conformity certification, and symbols and terminology." Article 10(4) adds that "the description of the subject matter … shall set out the relevant technical, quality and performance characteristics of that subject matter." These provisions create a strong bias in favour of product procurement. However, art.10(4) also states that "To the extent practicable, the description of the subject matter of the procurement shall be objective, functional and generic." The specific reference to functionality in this provision suggests that, despite the strong nods to the actual characteristics of the product in art.10, it will indeed be possible to describe the subject matter in functional terms.

This latter reading of art.10 is reinforced by other provisions of the Model Law, which support the allowability of functional procurement under these rules. For example, art.11, which sets out the rules on evaluation criteria, states that such criteria may include "the characteristics of the subject matter of the procurement, such as the functional characteristics of goods or construction". The rules on *how* procurement is to be conducted under the Model Law also support an interpretation in favour of functional procurement. The Model Law thus provides for two-stage procurement and requests for proposals with dialogue specifically for scenarios where "discussions with suppliers or contractors are needed to refine aspects of the description of the subject matter of the procurement and to formulate them with the detail required under article 10 of this Law"[54] and where it "is not feasible for the procuring entity to formulate a detailed

[53] Directive 2014/24, preamble, recital 74 (emphasis added).
[54] Model Law art.30(1)(a).

description of the subject matter of the procurement in accordance with article 10 of this Law".[55] Most notably, in both cases, the Model Law adds that these methods may be used if the procuring entity assesses that the particular method is needed "to obtain the most satisfactory solution to its procurement needs". The Model Law thus does not absolutely require an upfront description of the actual products to be procured but provides scope for formulation of the subject-matter in functional terms, specifically with reference to the actual "needs" to be fulfilled by the procurement.

This reading of the Model Law is confirmed in the *Guide to Enactment* accompanying the Model Law. In comment on art.10, the *Guide* notes that the subject matter's "description can be based on what the subject matter is made up of (input-based) or what it should do (output-based)." In its comment on the two-stage method, the *Guide* notes that "it should be noted that the initial statement of needs in the solicitation documents is likely to focus on the functional aspects of the items to be procured, so that the second stage allows for the technical aspects to be refined and included in the final request for tenders." In respect of the use of requests for proposals with dialogue method, the *Guide* states that in "practice, the procuring entity must be able to describe its *broad needs* at the outset of the procurement at the level of *functional* (or performance or output) requirements." The most telling endorsement of functional procurement under the Model Law, is the statement in the *Guide* that "unlike its 1994 counterpart, the 2011 text [of the Model Law] encourages functional specifications."

5. "Innovation partnerships" in the EU Directives

As noted in s.2 above, "innovation partnerships" is one of the specific procurement procedures provided for in the EU Directives. It is thus important, in the context of exploring the link between public procurement and innovation, to take a closer, albeit brief, look at this specific procedure and specifically at how it relates to functional procurement.[56]

"Innovation partnership" is a fairly new procurement procedure. It was introduced in the EU Directives in 2014 as art.31 of Directive 2014/24. The description of this procedure is about two pages in the Directives. The EU Directives on public procurement as a whole are about 230 pages, i.e. the text on innovation partnerships is not very detailed. Article 31 states:

> "In the procurement documents, the contracting authority shall identify the need for an innovative product, service or works that cannot be met by purchasing products, services or works already available on the market."
>
> "The information provided shall be sufficiently precise to enable economic operators to identify the nature and scope of the required solution and decide whether to request to participate in the procedure."

It is mentioned that the partners participating in innovation partnerships may be "conducting separate research and development activities." The aim of the innovation partnership procedure is the "development of an innovative product, service or works and the subsequent purchase of the resulting supplies, services or works…".[57] Potential participants' "capacity in the field of research and development and of developing and implementing innovative solutions" are key criteria to be used in selecting candidates.[58] The final contract must be awarded "on the sole basis of the award criterion of the best price-quality ratio".[59]

[55] Model Law art.30(2)(a).

[56] For detailed discussion of the procedure itself, see Pedro Cerqueira Gomes, *EU Public Procurement and Innovation. The Innovation Partnership Procedure and Harmonization Challenges* (Cheltenham: Edward Elgar, 2021); Oana S. Pantilimon Voda, "Innovative and Sustainable Procurement: Framework, Constraints and Policies" in Christopher Bovis (ed.), *Research Handbook on EU Public Procurement Law* (Cheltenham: Edward Elgar, 2016), pp.233–239; Sue Arrowsmith, *The Law of Public and Utilities Procurement Vol.1*, 3rd edn (London: Sweet & Maxwell, 2014), pp.1046–1060; Pedro Telles and Luke R.A. Butler, "Public Procurement Award Procedures in Directive 2014/24/EU" in Francois Lichère, Roberto Caranta and Steen Treumer (eds), *Modernising Public Procurement: The New Directive* (Copenhagen: DJØF Publishing, 2014), pp.160–180.

[57] Apparently, the terms "product" and "supplies" are used in a different way as compared to the use of "good" in s.3.1.

[58] Directive 2014/24 art.31(6).

[59] Directive 2014/24 art.31(1).

Obviously, the new procedure (innovation partnership) requires that the contracting authority shall identify the *need* for an innovative product, service or works that is not yet on the market. This is new, and very similar to the proposal regarding functional procurement in s.3.2 above. However, functional procurement is not mentioned in the legal text on innovation partnerships in art.31. Neither does the EU Directive indicate how the "needs" (etc.) shall be identified by the contracting authority.

In contrast to functional procurement, the innovation partnership can only be used if the contracting authority forms the view that existing solutions cannot meet the need. That is, with the innovation partnership procedure, the contracting authority must identify both the need and the absence of a solution in the market. Whereas functional procurement leaves the door open to suppliers to offer either existing or innovative solutions to the need at hand, the innovation partnership procedure places the obligation on the contracting authority to predetermine whether existing solutions are adequate or whether innovation is called for.

Innovation is thus primarily driven by the contracting authority in this procedure, which holds advantages and disadvantages. On the one hand, it may be questioned whether a contracting authority is best placed to determine whether innovation is called for, or whether it is the market, and innovators within the market, that are best placed to identify innovative ways of fulfilling the expressed public need or achieving the stated public function. This condition on the use of innovation partnerships limits the scope of the procedure, compared to functional procurement that can be used as a default approach. On the other hand, the explicit focus on innovation in innovation partnerships, in contrast to functional procurement, may serve to emphasise the signal to suppliers of the desirability of innovative solutions.[60] The use condition also creates compliance risks for contracting authorities relating to innovation partnerships, which may further undermine uptake of the procedure.

Another new element in the 2014 EU Directives is that the addition of the procedure of innovation partnerships includes the procurement of research and developments results. Hence, public procurement in an innovation partnership context includes procuring research and development results *as well as* the purchase of resulting products, services or works. [61]

It should be noted that the directive on innovation partnerships (art.31) mentions "innovative products", but there is no methodology proposed to describe these products. We have argued that innovative products cannot be described—if it means that an innovation (a non-existing – new—product) shall be described. However, the "needs" for innovative products can and should be identified. This is similar to describing the functions that shall be fulfilled by the new products when functional procurement is pursued.[62]

Hence, innovation partnerships make possible a long-term relationship between the contracting authority and potential suppliers for development (research results) and (later) purchase of new products. It is intended to be a combination of procurement of research results and of new products (innovations). The new procedure, at least conceptually, signifies increased acceptance of interaction and collaboration in public procurement aimed at innovation.[63]

This procurement procedure is new, and the (short) directive (art.31) needs a much higher degree of specificity to become operative (just like functional procurement).[64] This might be the reason why innovation

[60] Telles and Butler, "Public Procurement Award Procedures in Directive 2014/24/EU" in Lichère, Caranta and Treumer (eds), *Modernising Public Procurement: The New Directive* (2014), p.162.

[61] Including R&D results in public procurement, is like making procurement directives include Pre-Commercial Procurement (PCP), as analysed in Edquist & Zabala-Iturriagagoitia, "Public Procurement for Innovation (PPI) as Mission-oriented Innovation Policy" (2012) 41(10) *Research Policy* 1757. Before the inclusion of "innovation partnerships" in the EU Directives, PCP was not counted or classified as public procurement. We should also remember that public procurement is many times larger than publicly funded R&D—see s.1. If public procurement leads to the development of innovations, this procurement can be a many times more powerful innovation policy instrument than publicly funded R&D.

[62] See s.3.2 above.

[63] T. Torvatn and L. de Boer, "Public Procurement Reform in the EU: Start of a New Era?" (2017) 11(3) *IMP Journal* 431, 445.

[64] See Telles and Butler, "Public Procurement Award Procedures in Directive 2014/24/EU" in Lichère, Caranta and Treumer (eds), *Modernising Public Procurement: The New Directive* (2014), pp.164–180 for a detailed discussion of some of the uncertainties pertaining to the innovation partnership procedure relating to aspects such as selection criteria, how the phases must be set up under the procedure, setting appropriate limits on time and costs,

partnerships have not yet been used in many procurements. Some have argued that the procedure does not bring much that is new to the EU procurement landscape, since very similar (if not the same) results could be achieved by other, pre-existing procedures.[65] Early empirical assessments of the new procedure seem to support this view.[66]

The low uptake of the innovation partnership procedure, in turn, makes it very difficult or impossible to evaluate public procurement pursued according to this procedure. A detailed plan of action related to innovation partnerships is as necessary for innovation partnerships as it is for functional procurement.

If functional specification and innovation partnerships is a possible combination, we could discuss how this marriage could be arranged. This could be done in the context of developing functional procurement into a full-scale procurement procedure.

6. Concluding remarks

The most important instrument to attain innovations by means of public procurement is descriptions of problems to be solved and functions that shall be performed by means of new products that are developed and procured. The best way to avoid excluding innovations in public procurement is to avoid product specifications in the procurement documents.

By reformulating social, environmental or climate problems into functional specifications, public procurement can be a very powerful means to develop new technologies and other innovations that can contribute to the solution of societal and climate problems. They can influence not only the speed of the innovation processes, but also their directions. This is governed by the *objectives* that it is decided that public procurement shall have, e.g. that, in this case, certain sustainability or climate objectives shall be reached.

As Edquist and Zabala-Iturrigagoitia have argued, "[o]bviously, product procurement and functional procurement are 'ideal' types. The relation between the two may sometimes be complex and multifaceted."[67] For example, the documents behind the same procurement initiative may contain both product specifications and functional ones. An important question is whether our dichotomy instead could be seen as a continuum from product, to mixed, to pure functional procurement? [68]

Conceptualising these two ideal types of public procurement is important for us to be able to distinguish between the implications of each of these two categories. If only one of the two ideal types is present in the procurement documents, then the effects on innovation discussed in this paper will materialise. If both are present in the documents, then it is reasonable to assume that they are sometimes inconsistent and that the product specifications become dominant—and this is then an obstacle to innovation. The conclusion will then be that it is not a good idea to add a functional specification without removing the product specifications.[69]

including investment in the partnership, setting and evaluating targets for performance, rules on termination, alignment with state aid rules, and management of intellectual property.

[65] Telles and Butler, "Public Procurement Award Procedures in Directive 2014/24/EU" in Lichère, Caranta and Treumer (eds), *Modernising Public Procurement: The New Directive* (2014), p.161; Arrowsmith, *The Law of Public and Utilities Procurement Vol.1*, 3rd edn (2014), p.1050.

[66] R. Eadie and S. Potts, "Innovation partnership procurement: EU directive impact" (2016) 169 *Proceedings of the Institution of Civil Engineers, Management, Procurement and Law* 238, 244, indicating that 40.85% of respondents from government suppliers in Northern Ireland in 2016 considered that the introduction of the innovation partnership procedure would bring about little change in bringing faster innovation solutions and that "there appears to be little desire to use this procedure at the level of those writing the documentation" within Northern Ireland procuring entities, with more than 40% of respondents from these entities indicating that the new procedure will bring little benefit (245); I.T. Storsjö and H. Kachali, "Public Procurement for Innovation and Civil Preparedness: A Policy-practice Gap" (2017) 30(4) *International Journal of Public Sector Management* 342, 349, noting that some respondents in the context of Finnish public procurement doubted whether the innovation partnership procedure would make any difference.

[67] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 597.

[68] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 597.

[69] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 597.

However, this issue must be analysed further, preferably empirically. To our knowledge, no such study exists. Our preliminary conclusion on this point is that product and functional specifications should be dealt with separately—in the analysis as well as in the practical pursuit of public procurement.[70]

[70] Edquist and Zabala-Iturrigagoitia, "Functional Procurement for Innovation, Welfare, and the Environment" (2020) 47 *Science and Public Policy* 595, 597.